查询MAX6315US25D1-T供应商

19-2000; Rev 1; 1/99

Open-Drain SOT µP Reset Circuit

General Description

The MAX6315 low-power CMOS microprocessor (µP) supervisory circuit is designed to monitor power supplies in µP and digital systems. It provides excellent circuit reliability and low cost by eliminating external components and adjustments. The MAX6315 also provides a debounced manual reset input.

This device performs a single function: it asserts a reset signal whenever the V_{CC} supply voltage falls below a preset threshold or whenever manual reset is asserted. Reset remains asserted for an internally programmed interval (reset timeout period) after V_{CC} has risen above the reset threshold or manual reset is deasserted. The MAX6315's open-drain $\overline{RESET}$ output can be pulled up to a voltage higher than V_{CC}.

The MAX6315 comes with factory-trimmed reset threshold voltages in 100mV increments from 2.5V to 5V. Preset timeout periods of 1ms, 20ms, 140ms, and 1120ms (minimum) are also available. The device comes in a SOT143 package.

For microcontrollers (µCs) and µPs with bidirectional reset pins, see the MAX6314 data sheet.

Applications

Computers

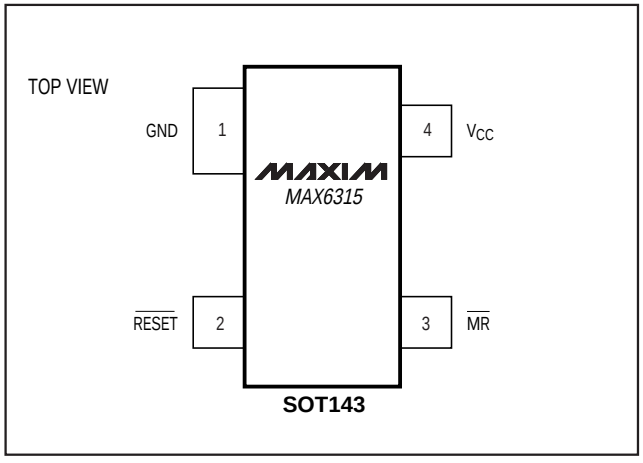
Controllers

Intelligent Instruments

Critical µP and µC Power Monitoring

Portable/Battery-Powered Equipment

Pin Configuration

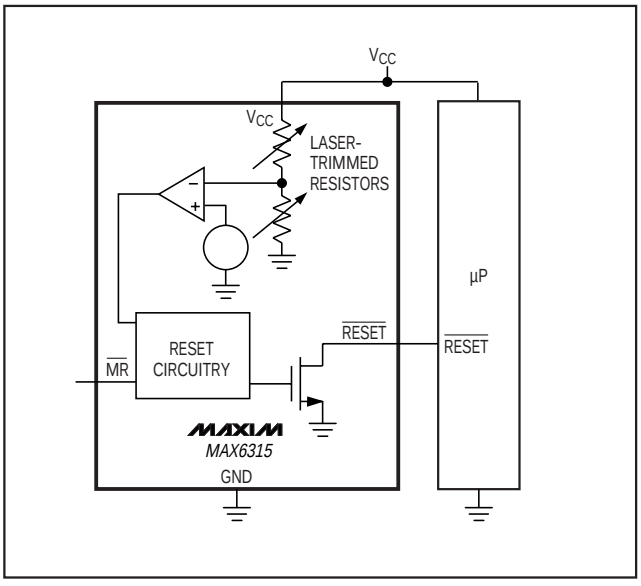


Features

- **Small SOT143 Package**
- **Open-Drain $\overline{RESET}$ Output Can Exceed V_{CC}**
- **Precision, Factory-Set V_{CC} Reset Thresholds: 100mV Increments from 2.5V to 5V**
- **±1.8% Reset Threshold Accuracy at T_A = +25°C**
- **±2.5% Reset Threshold Accuracy Over Temp.**
- **Four Reset Timeout Periods Available: 1ms, 20ms, 140ms, or 1120ms (minimum)**
- **Immune to Short V_{CC} Transients**
- **5µA Supply Current**
- **Pin-Compatible with MAX811**

Ordering and Marking Information appear at end of data sheet.

Typical Operating Circuit



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For small orders, phone 1-800-835-8769.

Open-Drain SOT µP Reset Circuit

ABSOLUTE MAXIMUM RATINGS

V_{CC} .....-0.3V to +6.0V
$\overline{RESET}$ .....-0.3V to +6.0V
All Other Pins.....-0.3V to (V_{CC} + 0.3V)
Input Current (V_{CC}) 20mA
Output Current ($\overline{RESET}$) 20mA
Rate of Rise (V_{CC}) 100V/µs

Continuous Power Dissipation (T_A = +70°C)
SOT143 (derate 4mW/°C above +70°C).....320mW
Operating Temperature Range .....-40°C to +85°C
Storage Temperature Range .....-65°C to +160°C
Lead Temperature (soldering, 10sec) .....+300°C

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

(V_{CC} = +2.5V to +5.5V, T_A = -40°C to +85°C, unless otherwise noted. Typical values are at T_A = +25°C.)

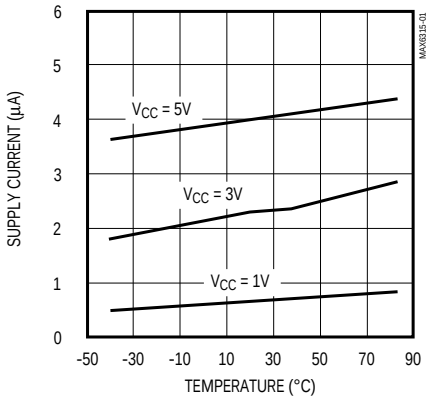
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Operating Voltage Range	V_{CC}	T_A = -40°C to +85°C	1.0		5.5	V
V_{CC} Supply Current	I_{CC}	V_{CC} = 5.5V, no load		5	12	µA
		V_{CC} = 3.6V, no load		4	10	
Reset Threshold (Note 1)	V_{TH}	T_A = +25°C	V_{TH} - 1.8%	V_{TH}	V_{TH} + 1.8%	V
		T_A = -40°C to +85°C	V_{TH} - 2.5%		V_{TH} + 2.5%	
Reset Threshold Tempco	ΔV_{TH}/°C			60		ppm/°C
V_{CC} to Reset Delay		V_{CC} = falling at 1mV/µs		35		µs
Reset Timeout Period	t_{RP}	MAX6315US_ _D1-T	1	1.4	2	ms
		MAX6315US_ _D2-T	20	28	40	
		MAX6315US_ _D3-T	140	200	280	
		MAX6315US_ _D4-T	1120	1570	2240	
MANUAL RESET INPUT						
$\overline{MR}$ Input Threshold	V_{IL}	V_{TH} > 4.0V	0.8			V
	V_{IH}				2.4	
	V_{IL}	V_{TH} < 4.0V	0.3 x V_{CC}			
	V_{IH}				0.7 x V_{CC}	
$\overline{MR}$ Minimum Input Pulse			1			µs
$\overline{MR}$ Glitch Rejection				100		ns
$\overline{MR}$ to Reset Delay				500		ns
$\overline{MR}$ Pull-Up Resistance			32	63	100	kΩ
$\overline{RESET}$ Output Voltage	V_{OL}	V_{CC} > 4.25V, I_{SINK} = 3.2mA			0.4	V
		V_{CC} > 2.5V, I_{SINK} = 1.2mA			0.3	
		V_{CC} > 1.2V, I_{SINK} = 0.5mA				
		V_{CC} > 1.0V, I_{SINK} = 80µA			0.3	
$\overline{RESET}$ Output Leakage Current		V_{CC} > V_{TH}, $\overline{RESET}$ deasserted			1	µA

Note 1: The MAX6315 monitors V_{CC} through an internal factory-trimmed voltage divider that programs the nominal reset threshold. Factory-trimmed reset thresholds are available in 100mV increments from 2.5V to 5V (see *Ordering and Marking Information*).

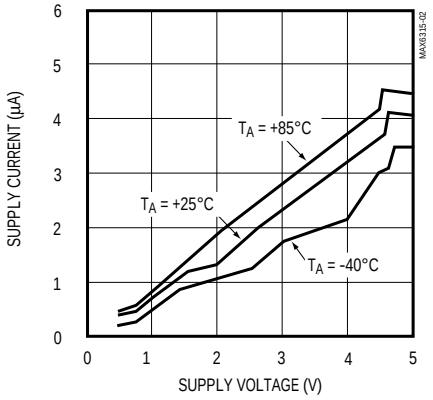
Typical Operating Characteristics

(T_A = +25°C, unless otherwise noted.)

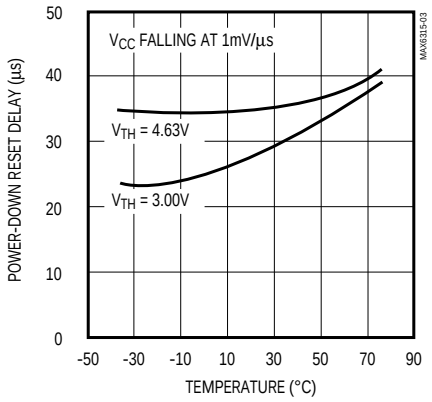
SUPPLY CURRENT vs. TEMPERATURE



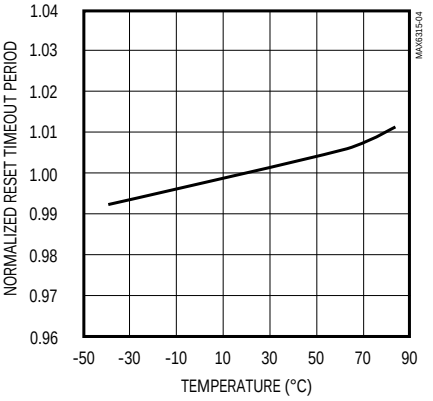
SUPPLY CURRENT vs. SUPPLY VOLTAGE



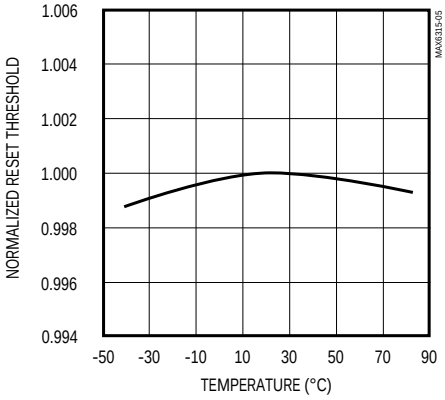
POWER-DOWN RESET DELAY vs. TEMPERATURE



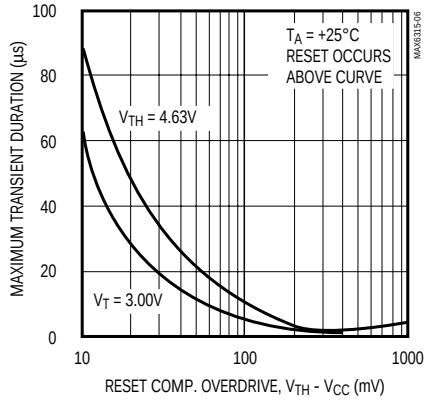
NORMALIZED RESET TIMEOUT PERIOD vs. TEMPERATURE (V_{CC} RISING)



NORMALIZED RESET THRESHOLD vs. TEMPERATURE (V_{CC} FALLING)



MAXIMUM TRANSIENT DURATION vs. RESET COMPARATOR OVERDRIVE



Pin Description

PIN	NAME	FUNCTION
1	GND	Ground
2	$\overline{RESET}$	Active-Low Open-Drain Output. Connect to an external pull-up resistor. Can be pulled up to a voltage higher than V_{CC}, but less than 6V.
3	$\overline{MR}$	Manual Reset Input. A logic low on $\overline{MR}$ asserts reset. Reset remains asserted as long as $\overline{MR}$ is low, and for the reset timeout period (t_{RP}) after the reset conditions are terminated. Connect to V_{CC} if not used.
4	V_{CC}	Supply Voltage and Reset Threshold Monitor Input

Open-Drain SOT µP Reset Circuit

Detailed Description

Reset Output

A microprocessor's (µP's) reset input starts the µP in a known state. The MAX6315 asserts reset to prevent code-execution errors during power-up, power-down, or brownout conditions. $\overline{RESET}$ is guaranteed to be a logic low for V_{CC} > 1V (see *Electrical Characteristics*). Once V_{CC} exceeds the reset threshold, the internal timer keeps reset asserted for the reset timeout period (t_{RP}); after this interval $\overline{RESET}$ goes high. If a brownout condition occurs (monitored voltage dips below its programmed reset threshold), $\overline{RESET}$ goes low. Any time V_{CC} dips below the reset threshold, the internal timer resets to zero and $\overline{RESET}$ goes low. The internal timer starts when V_{CC} returns above the reset threshold, and $\overline{RESET}$ remains low for the reset timeout period.

The MAX6315's $\overline{RESET}$ output structure is a simple open-drain N-channel MOSFET switch. Connect a pull-up resistor to any supply in the 0V to +6V range. Select a resistor value large enough to register a logic low when $\overline{RESET}$ is asserted (see *Electrical Characteristics*), and small enough to register a logic high while supplying all input current and leakage paths connected to the $\overline{RESET}$ line. A 10kΩ pull-up is sufficient in most applications.

Often, the pull-up connected to the MAX6315's $\overline{RESET}$ output will connect to the supply voltage monitored at the IC's V_{CC} pin. However, some systems may use the open-drain output to level-shift from the monitored supply to reset circuitry powered by some other supply (Figure 1). This is one useful feature of an open-drain output. Keep in mind that as the MAX6315's V_{CC} decreases below 1V, so does the IC's ability to sink current at $\overline{RESET}$. Finally, with any pull-up, $\overline{RESET}$ will be pulled high as V_{CC} decays toward 0V. The voltage where this occurs depends on the pull-up resistor value and the voltage to which it connects (see *Electrical Characteristics*).

Manual-Reset Input

Many µP-based products require manual-reset capability, allowing the operator, a test technician, or external logic circuitry to initiate a reset. A logic low on $\overline{MR}$ asserts reset. Reset remains asserted while $\overline{MR}$ is low, and for the reset active timeout period after $\overline{MR}$ returns high.

$\overline{MR}$ has an internal 63kΩ pull-up resistor, so it can be left open if not used. Connect a normally open momentary switch from $\overline{MR}$ to GND to create a manual reset function; external debounce circuitry is not required.

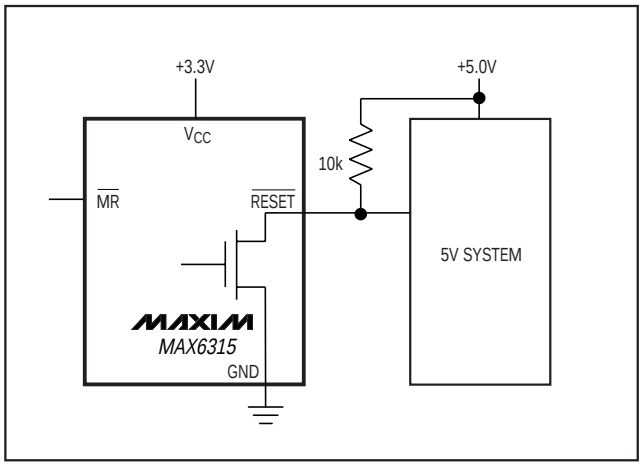


Figure 1. MAX6315 Open-Drain $\overline{RESET}$ Output Allows Use with Multiple Supplies

If $\overline{MR}$ is driven from long cables or if the device is used in a noisy environment, connecting a 0.1µF capacitor from $\overline{MR}$ to ground provides additional noise immunity.

Applications Information

Negative-Going V_{CC} Transients

In addition to issuing a reset to the µP during power-up, power-down, and brownout conditions, these devices are relatively immune to short-duration negative-going transients (glitches). The *Typical Operating Characteristics* show the Maximum Transient Duration vs. Reset Threshold Overdrive, for which reset pulses are not generated. The graph was produced using negative-going pulses, starting at V_{RST} max and ending below the programmed reset threshold by the magnitude indicated (reset threshold overdrive). The graph shows the maximum pulse width that a negative-going V_{CC} transient may typically have without causing a reset pulse to be issued. As the transient amplitude increases (i.e., goes farther below the reset threshold), the maximum allowable pulse width decreases. A 0.1µF bypass capacitor mounted close to V_{CC} provides additional transient immunity.

Ordering Information

PART†	NOMINAL V_{TH} (V)	MIN t_{RP} (ms)	SOT TOP MARK††
MAX6315US50D1-T	5.00	1	FX_ _
MAX6315US49D1-T	4.90	1	FY_ _
MAX6315US48D1-T	4.80	1	FZ_ _
MAX6315US47D1-T	4.70	1	GA_ _
MAX6315US46D1-T	4.63	1	GB_ _
MAX6315US45D1-T	4.50	1	GC_ _
MAX6315US44D1-T†††	4.39	1	GD_ _
MAX6315US43D1-T	4.30	1	GE_ _
MAX6315US42D1-T	4.20	1	GF_ _
MAX6315US41D1-T	4.10	1	GG_ _
MAX6315US40D1-T	4.00	1	GH_ _
MAX6315US39D1-T	3.90	1	GI_ _
MAX6315US38D1-T	3.80	1	GJ_ _
MAX6315US37D1-T	3.70	1	GK_ _
MAX6315US36D1-T	3.60	1	GL_ _
MAX6315US35D1-T	3.50	1	GM_ _
MAX6315US34D1-T	3.40	1	GN_ _
MAX6315US33D1-T	3.30	1	GO_ _
MAX6315US32D1-T	3.20	1	GP_ _
MAX6315US31D1-T	3.08	1	GQ_ _
MAX6315US30D1-T	3.00	1	GR_ _
MAX6315US29D1-T	2.93	1	GS_ _
MAX6315US28D1-T	2.80	1	GT_ _
MAX6315US27D1-T	2.70	1	GU_ _
MAX6315US26D1-T†††	2.63	1	GV_ _
MAX6315US25D1-T	2.50	1	GW_ _

PART†	NOMINAL V_{TH} (V)	MIN t_{RP} (ms)	SOT TOP MARK††
MAX6315US50D2-T	5.00	20	GX_ _
MAX6315US49D2-T	4.90	20	GY_ _
MAX6315US48D2-T	4.80	20	GZ_ _
MAX6315US47D2-T	4.70	20	HA_ _
MAX6315US46D2-T	4.63	20	HB_ _
MAX6315US45D2-T	4.50	20	HC_ _
MAX6315US44D2-T†††	4.39	20	HD_ _
MAX6315US43D2-T	4.30	20	HE_ _
MAX6315US42D2-T	4.20	20	HF_ _
MAX6315US41D2-T	4.10	20	HG_ _
MAX6315US40D2-T	4.00	20	HH_ _
MAX6315US39D2-T	3.90	20	HI_ _
MAX6315US38D2-T	3.80	20	HJ_ _
MAX6315US37D2-T	3.70	20	HK_ _
MAX6315US36D2-T	3.60	20	HL_ _
MAX6315US35D2-T	3.50	20	HM_ _
MAX6315US34D2-T	3.40	20	HN_ _
MAX6315US33D2-T	3.30	20	HO_ _
MAX6315US32D2-T	4.20	20	HP_ _
MAX6315US31D2-T	3.08	20	HQ_ _
MAX6315US30D2-T	3.00	20	HR_ _
MAX6315US29D2-T	2.93	20	HS_ _
MAX6315US28D2-T	2.80	20	HT_ _
MAX6315US27D2-T	2.70	20	HU_ _
MAX6315US26D2-T†††	2.63	20	HV_ _
MAX6315US25D2-T	2.50	20	HW_ _

†*The MAX6315 is available in a SOT143 package, -40°C to +85°C temperature range.*
††*The first two letters in the package top mark identify the part, while the remaining two letters are the lot tracking code.*
†††*Sample stocks generally held on the bolded products; also, the bolded products have 2,500 piece minimum-order quantities. Non-bolded products have 10,000 piece minimum-order quantities. Contact factory for details.*

Note: *All devices available in tape-and-reel only. Contact factory for availability.*

Open-Drain SOT µP Reset Circuit

Ordering Information (continued)

PART†	NOMINAL V_{TH} (V)	MIN t_{RP} (ms)	SOT TOP MARK††
MAX6315US50D3-T	5.00	140	HX_ _
MAX6315US49D3-T	4.90	140	HY_ _
MAX6315US48D3-T	4.80	140	HZ_ _
MAX6315US47D3-T	4.70	140	IA_ _
MAX6315US46D3-T†††	4.63	140	IB_ _
MAX6315US45D3-T	4.50	140	IC_ _
MAX6315US44D3-T†††	4.39	140	ID_ _
MAX6315US43D3-T	4.30	140	IE_ _
MAX6315US42D3-T	4.20	140	IF_ _
MAX6315US41D3-T	4.10	140	IG_ _
MAX6315US40D3-T	4.00	140	IH_ _
MAX6315US39D3-T	3.90	140	II_ _
MAX6315US38D3-T	3.80	140	IJ_ _
MAX6315US37D3-T	3.70	140	IK_ _
MAX6315US36D3-T	3.60	140	IL_ _
MAX6315US35D3-T	3.50	140	IM_ _
MAX6315US34D3-T	3.40	140	IN_ _
MAX6315US33D3-T	3.30	140	IO_ _
MAX6315US32D3-T	3.20	140	IP_ _
MAX6315US31D3-T†††	3.08	140	IQ_ _
MAX6315US30D3-T	3.00	140	IR_ _
MAX6315US29D3-T†††	2.93	140	IS_ _
MAX6315US28D3-T	2.80	140	IT_ _
MAX6315US27D3-T	2.70	140	IU_ _
MAX6315US26D3-T†††	2.63	140	IV_ _
MAX6315US25D3-T	2.50	140	IW_ _

PART†	NOMINAL V_{TH} (V)	MIN t_{RP} (ms)	SOT TOP MARK††
MAX6315US50D4-T	5.00	1120	IX_ _
MAX6315US49D4-T	4.90	1120	IY_ _
MAX6315US48D4-T	4.80	1120	IZ_ _
MAX6315US47D4-T	4.70	1120	JA_ _
MAX6315US46D4-T	4.63	1120	JB_ _
MAX6315US45D4-T	4.50	1120	JC_ _
MAX6315US44D4-T†††	4.39	1120	JD_ _
MAX6315US43D4-T	4.30	1120	JE_ _
MAX6315US42D4-T	4.20	1120	JF_ _
MAX6315US41D4-T	4.10	1120	JG_ _
MAX6315US40D4-T	4.00	1120	JH_ _
MAX6315US39D4-T	3.90	1120	JI_ _
MAX6315US38D4-T	3.80	1120	JJ_ _
MAX6315US37D4-T	3.70	1120	JK_ _
MAX6315US36D4-T	3.60	1120	JL_ _
MAX6315US35D4-T	3.50	1120	JM_ _
MAX6315US34D4-T	3.40	1120	JN_ _
MAX6315US33D4-T	3.30	1120	JO_ _
MAX6315US32D4-T	3.20	1120	JP_ _
MAX6315US31D4-T	3.08	1120	JQ_ _
MAX6315US30D4-T	3.00	1120	JR_ _
MAX6315US29D4-T	2.93	1120	JS_ _
MAX6315US28D4-T	2.80	1120	JT_ _
MAX6315US27D4-T	2.70	1120	JU_ _
MAX6315US26D4-T†††	2.63	1120	JV_ _
MAX6315US25D4-T	2.50	1120	JW_ _

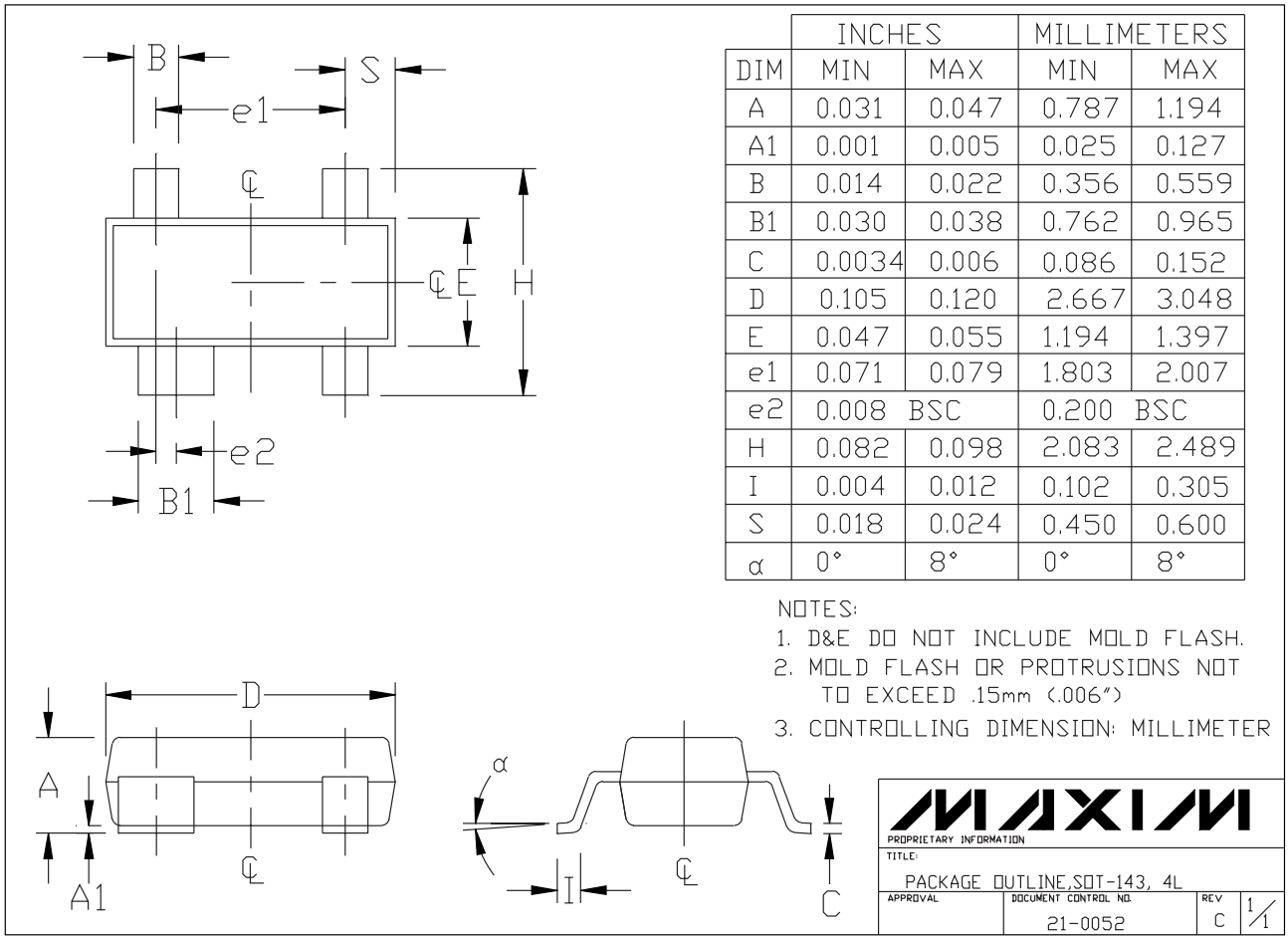
†*The MAX6315 is available in a SOT143 package, -40°C to +85°C temperature range.*
††*The first two letters in the package top mark identify the part, while the remaining two letters are the lot tracking code.*
†††*Sample stocks generally held on the bolded products; also, the bolded products have 2,500 piece minimum-order quantities. Non-bolded products have 10,000 piece minimum-order quantities. Contact factory for details.*

Note: *All devices available in tape-and-reel only. Contact factory for availability.*

Chip Information

TRANSISTOR COUNT: 519

Package Information



	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.031	0.047	0.787	1.194
A1	0.001	0.005	0.025	0.127
B	0.014	0.022	0.356	0.559
B1	0.030	0.038	0.762	0.965
C	0.0034	0.006	0.086	0.152
D	0.105	0.120	2.667	3.048
E	0.047	0.055	1.194	1.397
e1	0.071	0.079	1.803	2.007
e2	0.008 BSC		0.200 BSC	
H	0.082	0.098	2.083	2.489
I	0.004	0.012	0.102	0.305
S	0.018	0.024	0.450	0.600
α	0°	8°	0°	8°

NOTES:
1. D&E DO NOT INCLUDE MOLD FLASH.
2. MOLD FLASH OR PROTRUSIONS NOT TO EXCEED .15mm (.006")
3. CONTROLLING DIMENSION: MILLIMETER

MAXIM
PROPRIETARY INFORMATION
TITLE: PACKAGE OUTLINE,SOT-143, 4L
APPROVAL | DOCUMENT CONTROL NO. 21-0052 | REV C | 1/1

NOTES

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